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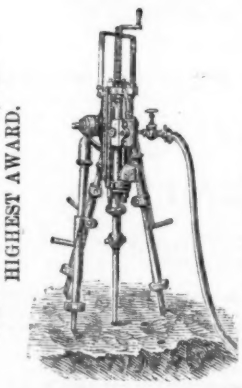

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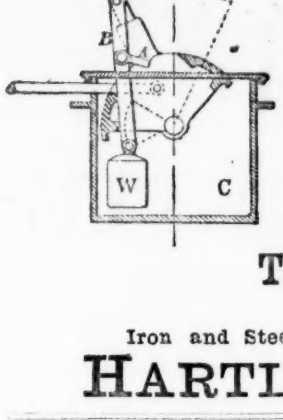

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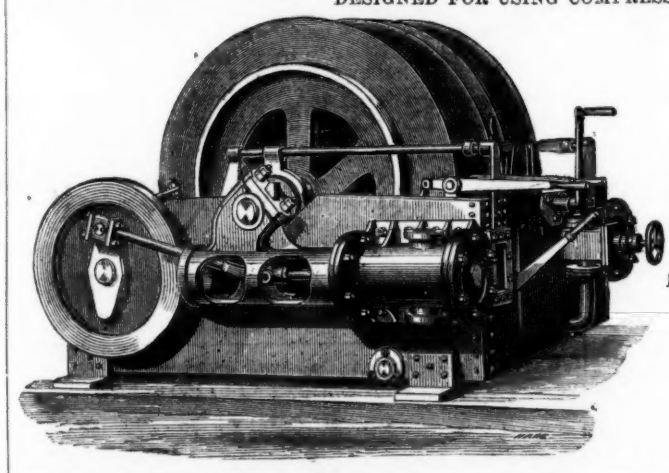

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The following letter has recently been received from the Ebbw Vale Company:— Ebbw Vale Works, Monmouthshire, July 5th, 1879.
GENTLEMEN,—I have much pleasure in stating that in the execution of your contract to drive, for the Ebbw Vale Steel, Coal, and Iron Company (Limited), a cross measure Drift from the Old Coal to the Rock Vein Coal, in the Glyn Pits, at Pontypool, you did so with dispatch, and to the entire satisfaction of all concerned. The distance driven was 453 yards in about 13 months. Yours faithfully, ROBERT JORDAN, Mining Engineer,
[The size of the above heading is 9 ft. by 13 ft.] Ebbw Vale Company's Collieries and Mines.

The "Burleigh" Machinery can be seen in operation at Manchester any time, by giving a few days' notice to the company.

Original Correspondence.

MINERAL STATISTICS OF THE MINING RECORD OFFICE.

SIR,—The *replique* in your last week's Journal of the Mining Record Office to my letter in your issue of August 30 it is to be regretted eludes my question. If by superficial examination of the volume of Mineral Statistics for 1878 it is intended to convey to the mind of the uninitiated that I have been deficient in composure, it devolves upon me, in rendering the duties of civility which usage prescribes, to prove my assertion that the letter and spirit of my extremely pertinent and important interrogatory have been evaded. How, can I be, with any consistency, accused of a superficial examination thus—"Had Mr. Thompson looked carefully at the volume, he would have found 1,173,411 tons foreign ore." My letter shows that I was fully cognizant of this supply, and Spain was distinctly mentioned by me as the chief source. What I wanted to know, I repeat, is what becomes of the foreign ore imported for mixing in its bearing upon the official returns of pig-iron produce. The question is very plain, and the answer is very simple. The produce from iron ore of the United Kingdom, mixed with a much superior description of foreign ore, imported for that purpose, and at great cost, cannot be stated to be pig-iron from iron ore of the United Kingdom. I have submitted my case with perspicuity, and no one is more concerned than myself in rendering the homage of unfeigned and unrestrained respect to the able compiler of the Statistics of the Mining Record Office. Permit me humbly to terminate this improvised correspondence with the celebrated sentence of that great genius—Augustin—"Nullum est peccatum quod fecit homo, quod non possit facere alter homo."

20, *Little Tower-street, Sept.* 9. WM. JOSEPH THOMPSON.

EXPLOSIONS OF FIRE-DAMP AND COAL-DUST.

SIR,—Messrs. Lyell and Faraday in 1844 expressed their belief in the inflammable nature of coal dust; other authorities since that time have expressed similar opinions. A certain quantity of fire-damp is considered to be necessary to cause an explosion of coal-dust. Mr. Galloway, from experiments he has made, concludes that a mixture of 1-60th, and even 1-112th part of fire-damp, with air of ordinary temperature and pressure, may be inflammable when fine coal-dust is present.

Not only is there danger to life from the force of the explosion of such mixtures, there is also the danger from choke-damp, arising from the large quantity of carbonic acid and nitrogen disengaged. The air in cold or dry weather takes up most quickly the moisture in the mine and coal; the coal-dust under this condition will be more inflammable, and more likely to produce an explosion.

The Crampton puddling-furnace produces a high degree of heat this is owing to the inflammable nature of the coal-dust supplied to the furnace. In flour-mills no lights should be used, where the air becomes charged with the fine dust of flour; from neglect of this precaution, or from allowing the stones from grinding to run dry, destructive explosions have occurred in these places.

The effect of directing a jet of coal-dust from a fiery vein into a fire was observed by an experimenter to be similar to that of directing a jet of gunpowder upon it. These statements and experiments may throw light on the causes of some explosions that have occurred in mines and seams of coal, where no fire-damp had previously been seen, and in other seams where not a trace of fire-damp had been seen for many years. M. E.

ON THE FLUCTUATIONS OF ATMOSPHERIC PRESSURE AS AFFECTING THE ISSUE OF FIRE-DAMP IN COAL MINES.

SIR,—The following observations were taken by H. Nasse in the Gerhard Prinz Wilhelm Mine, near Saarbruck, in the year 1876, over a period of 12 months. The observations were made at the outside of some closed up workings, in front of which were a series of stoppings. The fire-damp was registered as weak if it was only in quantity sufficient to catch fire at the flame of a lamp held up in a cutting in the roof at the face of one of the stoppings; 16 cases occurred under this head. It was registered as very strong only three times, the remainder of the registrations being marked average, or a medium between the two former.

During the year 1876 fire-damp was found in this locality of the mine on 26 separate occasions, extending over a period of 151 days, being an average of 5·8 days for each effusion; but in one case it remained for a month, and on 21 occasions it remained several days, and on the other four it remained one day only.

The average atmospheric pressure through the year having been ascertained, the pressure on the first day of each of the 26 periods was compared with it; also, the average pressure during the time that the fire-damp was present, and the lowest pressure in each period. The results were—1. That on nine of the first days of effusion the readings were above the average for the year (up to ·39 in.), and on the other 17 days below the average.—2. That the average readings in the 26 periods were seven times higher (up to ·24 in.), and 19 times lower than the mean annual pressure.—3. That the lowest readings in the 26 periods were twice higher—·12 and ·14 in.—than the mean annual pressure. These comparisons show that many of the effusions took place under a pressure above the average of the year. But the observations fully demonstrated that a diminution in pressure favours the effusion of fire-damp in coal mines. In every case the gas only appeared with the mercury falling, and any further diminution of importance caused an increase in the quantity of gas. On one occasion there was an issue of gas for two days, accompanied with a fall of ·11 in. only, but in all the other cases there was either immediately before or commencing at the same time a fall of over ·20 in. With four exceptions every fall of the mercury to this extent caused the fire-damp to make its appearance. The exceptions occurred on March 35, April 11, and May 6 and 11, and these were due, it is suggested, to some meteorological influences at that season. The conclusions drawn from these observations were that when a continuous diminution of pressure to some extent takes place fire-damp may be expected, and as the higher the mercury stands the greater the density of the gas given off and its comparative volume, the greater is the danger to be apprehended.

The observations further show that, leaving out four doubtful cases, the fire-damp disappeared in 15 cases out of 22 only when the pressure on the day of its disappearance was higher than on the first day. Of the other seven cases, those that showed the greatest difference in the relative pressures—·14 in., ·26 in., and ·30 in.—were after long periods of duration 14, 10, and 31 days respectively. In these cases it is probable that the long continuance of low pressure and effusion of gas had lessened the volume of it behind the stoppings. M. E.

SAFETY LAMPS.

SIR,—The subject of safety lamps so-called has been a burning question for the last 35 years or more to my knowledge, and yet we do not seem to have advanced much towards the acquiring a really safe lamp for use under all ordinary conditions of gaseous mines; at least the great bulk of the lamps still used are the old standards of 40 years back—the Davy, Clanny, and Stephenson lamps. The two former have been demonstrated over and over again to be unsafe in a current of an inflammable nature moving at a velocity of 6 or 7 ft. per second. I agree with Mr. Ashworth that these two lamps are on a par as to their facility for passing the flame in an explosive current. But the Stephenson lamp has proved itself most valuable in averting explosions when outbursts of gas have occurred, and I must own my belief that this lamp, if properly constructed, should not explode on the outside in a current of 12 ft. per second or more. The Hetton experiments certainly do not place the Mueseler lamp in a favourable light, though the lamp or lamps experimented with may not have been made on the Belgian type, which may account partly for the unsatisfactory result. It is said, however, that this lamp readily explodes when held in a slanting position in inflammable currents.

Several new lamps have lately been experimented on and introduced to some extent in fiery mines. It is highly desirable that every facility should be afforded for testing these new lamps; that one or more skilful experimenter should be appointed to this task, and that every lamp should be tested at the same place and under exactly the same conditions. By such means it is probable that a lamp fulfilling all the necessary conditions may be found and adopted which should supersede the imperfect kind of lamps now in use. M. E.

TRIALS OF SAFETY-LAMPS AT WIGAN.

SIR,—Will any of the gentlemen who witnessed these experiments kindly say if a man could live in the atmosphere in which these lamps were tried? AN ENGINEER.

LOOSE BEDDED STAMPS.

SIR,—Although I am at all times ready to recognise the exertions of inventors when they are worth recognition, I think the idea of stamping mineral upon a rolling truck is so decidedly unminerlike that especial care should be taken not to let any such projects be introduced at mines where it is desired to make profits. The invention to which I allude is that of Mr. Edwards, of Shoreditch, which is, in my opinion, nothing more than a common arrangement of Cornish stamps heads to work on a truck with wheels which he calls a travelling anvil block. The hanging, lifting, and arranging of the stamps has nothing whatever new about it, so I shall pass them by, and go at once to the truck.

Under the lower faces of the hammers, or to use miners' phraseology under the stamps heads, the inventor arranges an anvil-plate or block of cast-iron, steel, or other hard material, and he makes this plate of sufficient thickness to endure the blows of the hammers, and of a width on its upper face rather greater than that of the hammer faces. The length of the block is somewhat greater than that of the entire set or row of hammers to which it is applied, and he arranges it in a line directly under such set or row of hammers, and he supports it upon rollers, friction wheels, or guides, so that it can be made to travel backward and forward for a sufficient distance under the hammers in the direction of its length. Round the upper face of this travelling block or anvil he fits and fixes a hopper, preferably of wrought-iron, the sides of which rise sufficiently high from the face of the anvil to retain the material which is to be operated upon, whilst at one end it is widened and extended sufficiently to form a convenient receptacle into which such material is fed by hand or otherwise, and at its other end it is left open, and the stamped material is then delivered from it into any convenient receptacle.

The anvil block described is not arranged in a perfectly horizontal position, but the end at which the material is supplied is at a higher level than that at which it is discharged as described; and the material thus travels slowly from end to end of the anvil block, which is itself made at the same time to travel backward and forward longitudinally, so as to bring a fresh part of its surface under the hammers at each blow, and also for the purpose described. The anvil block may be made to travel backward and forward as described by any convenient means. For instance, a toothed rack may be connected to it gearing into a corresponding toothed wheel or segment, which is made to make a partial revolution slowly backward and forward by means of a crank and connecting rod upon a shaft made to revolve by the same power which drives the hammers, or by other convenient power. It is unnecessary to say more about this part of the invention, as it is evident that any mechanical arrangement would be equally efficient.—*Truro, Sept.* 8. CORNUBIENSIS.

THE MONOPOLY OF THE WORLD'S CONSUMPTION OF STEEL BY SWEDISH LAPLAND.

SIR,—My correspondence of August 16, 23, and 30 adduced certain facts connected with the New Gellivare Company (Limited), to which I beg permission to give extension. However disastrous the actual position which this company, unfortunately, is in, an incalculably brilliant future is in store by at once in this steel era carrying out the system of fusion and transport submited as their "seule planche de sauvetage." Dr. Percy's "Metallurgy" states—"The Gellivare ore is one of the most important ores of iron, from which the finest qualities of steel are produced." He assigns the very first place to the Gellivare ore, even before the Dannemora and other world-renowned ores. Little did I imagine when seeing the Hoop L bars hammered out at Löfsta, and by a concatenation of events brought into daily personal contact with the chief member of Baron de Geers' family that I should at this period of my life be able to give effect to such a high authority as just cited in assigning the summit of excellence for steel manufacture to the Gellivare, on a par, if not above, the Dannemora ores. Through my limited experience in the sale of the "Dickson" iron, shipped to my consignment from Swartwik, on the spot in Sheffield, I have been practically impressed with the immense superiority of the Löfsta iron, supplemented with the brand "Sykes" at a period which I well remember.

Prof. Akerman, in his important work "On the State of the Iron Manufacture in Sweden in 1876" states "The Dannemora ore contains only 0·003 per cent. of phosphorus." Mr. Isaac Lowthian Bell's paper on the separation of phosphorus from English pig-iron, read before the Iron and Steel Institute, states—"The cinder contained 4·016 per cent. of phosphorus, and cinder and iron averages 0·976 per cent. of phosphorus." Mr. Charles Smith, of Barrow-in-Furness, in a paper read before the same Institute, "On the Iron Ores of Sweden," states—"We may assume future research will find the greatest store of Sweden's purest ore located in the most northern provinces." The Gellivare property is actually in the extreme northern district. The same important sources inform us that for many years to come Sweden will be a dangerous competitor to other countries in regard to quality only, as the high price of fuel, and its scarcity (from which Gellivare is an exception, as shown in the sequel) preclude the production of any cheap brands for the export trade. The Gellivare produce of steel will be exclusively of the finest quality, which is the grand desideratum now demanded. Hearken to the proceedings of the British Association just held at the Steel Emporium of Sheffield. My letter of August 30 gave the opening address of the President of the Chemical Section, which stated—"The Bessemer process did not eliminate phosphorus from pig-iron;" and a paper read on the separation of iron and phosphorus, especially with reference to the manufacture of steel, states—"The importance of the complete removal of phosphorus from pig-iron is of the utmost importance to this country, as the greater part of the ores raised and iron made is unfit for the manufacture of steel by the Bessemer process." There is no question that with the Bessemer process and either coke or coal for fuel, it is utterly impossibly to separate the phosphorus from the iron. Gellivare steel can be manufactured perfectly free of phosphorus with charcoal as fuel, of which their engineer-in-chief's report states—"An almost inexhaustible supply of charcoal may be obtained for consumption in the manufacture of metals," and with the application of hydrogen and oxygen gases. Thoroughly imbued with the conviction that the Gellivare property is destined to furnish the steel desideratum so eagerly sought after, I shall undauntedly endeavour to bring to a successful issue the course I have entered upon. The published accounts and reports of the general meeting of shareholders testify, with no reasonable prospect of a change under present management, to the entirety of the fully-paid-up capital of the company being absorbed or, in unmistakable language, irretrievably lost, infinitely worse than a full-powered steamer at the equator with her shaft broken. In the words of their engineer-in-chief—"The primary object of the company was the utilisation of the large quantity of rich ore." Their latest published accounts show a loss of 7*l.* a ton on all their iron consigned to England, to which country the whole was shipped. The further manufacture of iron has been discontinued. The loss on wood, all of which was consigned to London, could, if otherwise dealt with, have turned out a profit, by shipping their inferior descriptions of deals to other and suitable markets, a firm of undoubted position has signified to me their assent to negociate upon an extremely favourable footing to the company. Shareholders will, in the profit and loss account of Oct. 31, 1878, observe the very first entry—"Profit on wood consigned to London, 229*l.* 10s. 5d.," which assumed profit dissolves into a loss through the entry on the debit side of 2098*l.* 10s. 4d. for broker's commission. The London market is the most unsuitable for the sale of the great bulk of the Gellivare wood production. The company own five steamers. Depreciation is written off on two only, whereas if applied to all as usual a loss ensues. There is a loss on the farms. A serious and practical consideration now arises. What prospects have the mortgagees of obtaining payment of the interest on their loans, apart from the loans themselves. It is a most valuable property, in the judicious and energetic development of which the world at large is deeply concerned, and at no previous period has such an auspicious opportunity presented itself for its exploitation. I submit, with these premises, the moment has arrived for the mortagees to arrange with the company to administer the whole concern for the benefit of whom it may concern. There remains one important element of success, which I have deferred alluding to for obvious reasons in the present disorganised state of affairs. WM. JOSEPH THOMPSON.

20, *Little Tower-street, Sept.* 9.

NEW MEXICO—No. V.

SIR,—The time passed since my last report has been one of strife and uncertainty for the people of New Mexico. Would the first railway penetrating into this territory disregard the sites of its predominant resources, and pass the territory on the shortest line by an arid country, or would it turn out of the straightest line, and reach the Rio Grande at a point where the natural resources of every description (coal, ores, and agriculture) are more accumulated than in any other district, either north or south?

The latter course has been selected by the railway authorities, and your correspondent has the satisfaction that his endeavours to demonstrate the existence of these resources to the deciding powers has had the above generally desired result. I served to these authorities as a guide over mountains and valleys, and what these mountains and valleys showed was a more persuasive argument than the $60,000 which might have been saved by the selection of the straighter line.

The New Mexico and Southern Pacific Railway Company, a branch organisation of the Atchison Topeka and Santa Fe Railway Company, has reached Las Vegas, in the heart of the territory, and by December next will reach Bernalillo, on the Rio Grande, the centre of the great mining district which will develope in this part of New Mexico. I may, therefore, mentally guide your readers over the same route as the railway authorities were guided, in order to give a proper idea of the resources of this country, which at present probably offers more inducement and better chances to enterprise than any other on this continent. In a couple of good buggies, with swift horses, we soon left the vineyards and fruit gardens of the town of Bernalillo behind. Amongst the excurtionists were the vice-president of the railway company, the company's solicitor, an expert, and also the present delegate of New Mexico to the United States Congress. After ascending to the high plateaus bordering the valley of the Rio Grande, until now pasture only for stock, but destined when in future irrigated with the waters of the Great River to become the abode of happy hundred thousands, we entered the valleys of the Sandia Mountains proper, alighting first in Canon de las Huertas, where the old mine and new open cut and the Montezuma Mines, 1 to 5, were examined.

These mines are on a true fishure contact vein, carrying as base metal lead (sulphide and carbonate), and giving assays in gold and silver varying all the way from $18 to $80, but averaging probably not less in the great body of ore than $30. The ore is mechanically concentrateable, which lessens the actual cost of reduction to bullion to less than $10 per ton of ore, leaving a good margin even if lead be worth nothing but the freight. The mines are owned by parties desirous to transfer two-thirds interest in their rights (600 feet by 7500 feet) to a party setting up the reduction works for $60,000 (12,000*l.*), and forming with them a company. There is no reasonable doubt but that 40 tons of ore daily can be produced now, and more as the mine will be further developed. One-seventh part in these mines changed hands during the visit, some of the miners selling theirs for ready cash, which as yet is a rare thing with them, and goes far. From the Montezuma Mines the party proceeded to Copperopolis, where the night was passed, and in the morning, after examining the copper furnaces, we mounted again, and leaving the deep valley of the San Pedro Creek, and passing over the plain encircled by the Old Placer, New Placer, San Pedro, and Sandia Mountains, ascended the Picacho, one of the peaks of the Tuerto Mountains, and alighted in front of a large open quarry, called the Cortez Copper and Gold Mine, No. 1, 22 miles from the Rio Grande, but connected therewith by the open valley of the Arroya Tungue, of which I shall have to speak further on. The Cortez Mine is situate on a land grant confirmed by the United States Congress, and for which the United States have issued a patent. The present owners have undisputed possession of the mine for long years, not only by virtue of a part interest in this land grant, which in total comprises 42,000 acres of land, but also in complying with the United States law regulating such claims, thus avoiding the possibility of conflicting interests The ore deposit on which the quarry is opened is a stratum 35 feet thick, dipping from the quarry into the mountain with a dip of 10°. The mine has for a long time been, and is at present, exclusively worked for a streak of ferruginous gold ore, carrying free gold, and comprising part of the deposit, which in its large bulk is rich copper ore. As a result of this mining for gold ore there is a dump pile in front of the quarry on the slope of the mountain, consisting of about 6000 tons of copper ore, assaying 7 per cent. in metallic copper, while large piles on the dump of choice ore assays 14½ per cent. of copper. The stopes in the quarry show a proportion of about 70 per cent. copper ore, 10 per cent. gold ore, and 20 per cent. calcareous spar, and calcareous breccia.

The same ore deposit is opened and visible at a horizontal distance of 650 feet of the quarry to where the claim extends and the northern prolongation, and at a distance of about 1000 feet in a horizontal southern district, in which the claim extends 850 feet. The owners have a gold mill of 15 stamps in course of construction, and do not appear desirous of selling any of their interest, but would contract for any quantity of copper ore to a smelting company established on the coal field at a distance of only 6 miles on the Rio Grande at a price for the copper in the ore of half the New York quotation for copper, which leaves a smelter's margin double as high as the best margin the Swansea smelters ever have on the ore they buy; and if this would promote the enterprise, and assist in accomplishing it, they would sell to the smelting company a part interest in the mine at a reasonable price. I make these statements with the full certainty that for years past and to come no such favourable opportunities as these have been offered to an English enterprise. As but a short distance does separate us from railway connection, it is an easy matter to come and see and find out whether my statement is correct or favourably coloured. I hope disappointment will be the consequence, and that it will be found that not by far my description came up to the real merits of the case. A production of 500 tons of copper from this mine per day will meet with no technical difficulties, as the stripping of the overlying debris lays the ore bare for quarrying: 12 cubic feet make 1 ton of ore of at least 7 per cent. copper, and 172 cubic feet will make 1 ton of copper. The mine has for every foot of depth 52,500 cubic feet of ore and rock, of which 70 per cent. are copper ore, or 36,750 cubic feet of ore, with a metalic content of over 200 tons of copper. As the deposit is known to extend more than 3000 feet across the mountain, there can be counted on 600,000 tons of copper to be produced out of said mine. He who doubts may come and see. The railroad men did not doubt, but came to the conclusion that this mine and the coal in the valley below on the road towards the river were worth giving the main railroad line a turn, so as to assure the traffic to be produced by it. Enquiries have been made for the acquisition of interests in the Cortez, in consequence of this visit to it, but nothing definite has been arrived at yet, both parties thinking they have a hold on the other, the offer by the mine owners, as above specified, is still open, and for parties controling the means there is a big stake to be made from the copper and gold mine.

The party descended by what will be the future branch road from the Rio Grande to the mine. Gold washers were seen at work, where a small stream of water gave an opportunity thereto. The outcrop of a 5-feet coal vein of good quality (anthracite) was passed in the creek, and a halt was made near the ruins of the Indian town, Tun-

que, where in a long washout three different coal veins cropped out, two of which are of workable qualities, and the night was spent comfortably under the trees, where once a large Indian population had their abode, and where soon the steam whistle will sound the beginning of a new era. In the morning the coal beds were thoroughly examined, and after a pleasant drive down the Arroyo Tunque and Rio Grande the town of Bernalillo was reached again. The expedition had visited but a small portion of the localities where metallic ores have been discovered, but those seen were the more important ones and were sufficient evidence for the resources of the district. The climate is healthy and agreeable, and work outside can go on all the year round, and all economical features are more favourable than in any other one of the territories on this continent, common labour being plenty at 10 cents per hour, and agricultural districts being near by. It has always been my desire to interest some of your countrymen in our mines. If I do not succeed it shall not be for lack of correct information. F. M. F. CAZIN,

Bernalillo, New Mexico, Aug. 15. Mining and Civil Engineer.

COLOMBIAN HYDRAULIC MINING COMPANY.

SIR,—I have waited for the arrival of the last monthly report from our agent in Colombia (which appears in the *Mining Journal* of the 30th ult.) before addressing you further in reference to the position and prospects of this company. The very critical position thereof, and the strong feeling I have respecting the desirability and efficacy of the publicity afforded by your columns, are my only, but I trust sufficient, reasons for troubling you at such length in the matter. In my two former letters (which appeared in your issues of the 16th and 23rd ult.) taken together with the present one, I think I shall have succeeded in showing the vital and pressing necessity that exists for the shareholders at once taking the matter into their own hands, and insisting upon the adoption of the course I have advocated, unless there is to be a speedy, disastrous, and final collapse of this so recently reconstructed company.

It is almost necessary, in order fully to understand the position, that I should briefly state the plan of the amalgamation of the three original companies which has recently been carried through. By this scheme shareholders in the Malpaso Company in respect of either preference or ordinary shares received four shares in the new company for every five in the old one, whilst those holding preference shares actually had allotted to them in addition an amount of shares in the new company equal to the dividend which had been set apart thereon (but not paid for the conclusive reason that the Malpaso Company was never in a position to do so); Rica shareholders received two new shares for every five old ones; and Malabar shareholders also received two shares in the new company for every five in their original company. Although I was not opposed to a fair amalgamation, so as to secure economy of working and control, I expressed at the time my objection to this scheme on the emphatic ground that it was not equitable to the Malabar shareholders. Only the fact that many of the shareholders were more or less interested in all the three companies could have justified for a moment an amalgamation on the foregoing terms. For what in March last were the respective positions of the old companies? The Malpaso Mine was at work with one monitor, but in want of additional pipe, and its liabilities considerably exceeded its assets. The Rica Mine for want of water, had ceased to be worked for some three years or so previously, and its liabilities also greatly exceeded its assets. The Malabar Mine was at work with two monitors, had plenty of pipe, and its assets and liabilities about balanced. As regards water supply, Malpaso possesses some 500 (miners') inches; Rica is virtually without any water supply; Malabar possesses the magnificent supply of some 1600 or 1800 (miners') inches. As regards their respective extent, Malpaso and Rica each consist of one known gravel deposit; Malabar contains at least five such deposits, besides an extensive and valuable coffee estate, which it appears has since the amalgamation been sold for 1600*l.* And what is now the position of the amalgamated company? The liabilities of Malpaso and Rica have been only converted into debentures carrying 15 per cent. interest, with 20 per cent. bonus on re-payment, and which in the meanwhile constitute a first mortgage upon the whole property of the company; whilst the actual amount of working capital at its disposal is practically represented by the sum realised from the sale of the coffee estate, which was originally owned by the Malabar Company.

The Colombian Hydraulic Mining Company is, however, now *un fait accompli*, and my only desire is to avert its failure, and secure if possible its success; but to accomplish this a complete change of management is imperative, for I will now proceed to show that, if the six years unfortunate experience of the old companies had not been sufficient for that purpose, the four months experience of the new company should of itself suffice to convince the most credulous shareholder what a misleading and fatal basis to proceed upon is that afforded by Mr. Welton's reports. The present company was avowedly formed with the view of suspending work for the time at the Malabar Mine, and transferring the pipe therefrom to and concentrating further operations and expenditure upon the Malpaso Mine, and this under the continued management of Mr. Welton, the board still reposing "entire confidence" therein, notwithstanding that his three years sole control of the mine and funds of the Malpaso Company, with its reported rich gravel, had only resulted in disappointment and increased indebtedness, and in accordance with such purpose the board appear to have proceeded to advise Mr. Welton accordingly. In the board's circular of April 24 last, after giving an extract from a letter of Mr. Welton's, dated August 19, 1877, referring to the great richness of the Malpaso gravel, they stated—"The directors draw the attention of the proprietors to this point at so much length in order to put clearly before them what is about to be carried out. It is quite evident that the main cause which has all along impeded the work at the mine, and prevented steady profits being made from the commencement, has been the fact of the sluice not having been brought in at a sufficient depth to bottom the channel of auriferous gravel. It is now the intention of the superintendent to recommence work at a point deep enough to enable him to bottom the (Malpaso) channel." Now, let the shareholders carefully and seriously compare the above intentions and instructions of the directors upon the formation of the new company, which undoubtedly were founded upon Mr. Welton's own former advices, with what Mr. Welton reports under date of July 19 last, which is as follows:—"The board now order that nothing shall be spent at Malabar, but at the time of writing they would be under the impression that by moving the Malabar pipe over to Malpaso returns equal to all expenses would be made at once; this, however, is extremely doubtful. Further explorations of the last point proposed for opening at a deeper level show that a wide ridge of bed-rock would have to be traversed. The great risk of opening at Malpaso at a deeper level arises from our uncertain knowledge of the direction and depth of the channel, and until something positive is known regarding these matters the risk of failure to obtain any satisfactory result is immense, and the carrying out of this work, and finding ourselves blocked by a wide bar of bed-rock, would be certain to absorb the last resources of the company." So it already appears that the very work to enable Mr. Welton to accomplish which a reconstruction involving such sacrifices by the shareholders was agreed to, is now reported by himself to be practically impossible. In his same report of July 19 last Mr. Welton further states—"In the meantime, with the hard gravel we have to operate upon, (at Malpaso) it is impossible to get large returns, although the gravel is rich, and it is clear that without pipe-clay the gravel at Malabar, poor as it was, would have left a profit. Having now found better gravel, and without pipe-clay (at Malabar), it has appeared to me and all others who know these mines that our best prospects for present profit was to work this gravel." Thus it further appears that weighted as it is with mortgage debentures, and indebted to Malabar for its available working capital, if the complete failure of the present amalgamated company is to be averted it will be by means not of the Malpaso but of the Malabar Mine.

Considering all the circumstances which at some unavoidable length, but I hope with sufficient clearness, I have now set forth, and their important bearing upon the responsibility of the directors in continuing to risk the remaining funds and the future prospects of the long suffering shareholders in the hands of Mr Welton, I think the board without a single day's delay should call a general meeting to take into consideration the critical position of affairs. I feel that I have now, as far as was in my power, done my duty towards my fellow-shareholders in putting the matter thus fully before them. I have only to add that, whilst I consider it is especially the duty of the board to find a competent person to entrust with the conduct of operations in Colombia, I do know of a reliable and qualified gentleman who I think might be induced to visit the mines on behalf of the shareholders, and to remain there long enough to examine thoroughly into them and their mode of being worked, and to ascertain practically whether under capable management they can be made to yield us profitable returns. A. GRAY.

Lawrence Pountney-lane, E.C., Sept. 4.

MINING IN COLORADO—No. VIII.—PARK COUNTY.

SIR,—Mosquito Creek, continued from last.—Along the dividing ridge mines continue to be opened out of enormous value. The Mountain King, one of a group of 15, whose collective extent is about one mile in length by 1500 ft. in width, has a shaft now down on 30 ft. of solid silver ore. I do not consider it a lode, as it is in the Devonian limestone deposits, the minerals of which lie in seams interstratified with the quartzite, lime, and porphyry. The ore consists of silver-lead, copper, hydrate of iron, a little zinc, blende, and manganate, the matrix being a calco-baryta; it assays from 50 to 200 ozs. in silver, with a little gold. For the first 20 ft. the ore is light, its specific gravity being only 285, therefore weighs 178 lbs. per cubic foot, but at the bottom of the shaft, where the galena predominates, the specific gravity is 650, therefore weighs 406¼ lbs. per cubic foot. As yet there does not appear to be any indication of a termination of the deposit downward, but, of course, there is such somewhere, and this will be, in my opinion, on the first porphyry bed. The property is owned by the great railway magnate, W. A. H. Loveland, of Golden City, and a few associates. A company has been organised this past week, in "ten million capital" (2,000,000*l.*) A smelting works is projected, that will be erected in the neighbourhood. A number of other mines in the same neighbourhood are opening out splendidly. If there were reduction facilities, so that the ore could be made immediately marketable, an output of 300 tons a day is even now available, and before the end of this year double this quantity may be obtained. So great is the demand for mineral properties along these hills that for miles there is scarcely an acre of ground of any prospective value now unclaimed. The whole country is alive with miners and mine investors. The town of Alma, which only nine months ago might be called a "deserted village," is now filling up so fast that there is scarcely a house to be obtained, and all the hotels are crowded. Two coaches arrive and depart for Leadville, who run over the snowy range by the new road in three hours. Two other coaches come in and depart twice a day from Fairplay and the end of the railway tract. It is years since such lively times have been seen here. My museum is now an attractive point; here all the ores of this part of the country are represented, and arranged in cans and boxes bearing the names of the respective owners of the mines, as well as the geology of the districts. Several very heavy sales to foreign capitalists have been made during the past month, and others are in abeyance, on confirmation of value by experts from different parts of the Union and from London. All that is now wanted is good smelting and other reduction works, the owners of which, if they will pay the miners a fair value for their ores, a second Swansea may be established. Prof. Edison wants platina; I have written him to-day expressing my views on the mineral substance supposed to be platina, of which many samples have been sent to my offices—it is nothing other than magnetic iron and grey copper. If Mr. Hollway would come to Buckskin and erect works on his non-fuel smelting process he would in a short time make a fortune, but what is most wanted is hydro-metallurgy to work up our 40-ounce silver ores.

Alma, Aug. 20. CHARLES S. RICHARDSON, G.M.E.

BANKS OF SILVER.

OPINIONS OF LIEUT.-GOVERNOR TABOR, PROF. RICHARDSON, AND OTHER EXPERTS ON THE LOVELAND BONANZA.

IT IS NOT A FISSURE VEIN, BUT AN ENORMOUS DEPOSIT.

The recent remarkable mineral discoveries in Park county have attracted general attention, and we have given from time to time such meagre details as we were able to gather. It was not until yesterday that it was possible to obtain reliable facts in regard to what must be considered the most remarkable movement in mining matters that has occurred in this county for years, and will undoubtedly attract thousands of people and millions of capital.

The mining claims on Buckskin mountain, discovered in March last by A. H. Clements and Columbus Weisse, in which Hon. W. A. H. Loveland is largely interested, were yesterday consolidated and a company formed under the title of the Fannie Barret Mining Association with a capital of $10,000,000, in shares of $10·00 each. The officers being W. A. H. Loveland, president and treasurer; A. H. Clements, secretary; and W. A. H. Loveland, Columbus Weisse and A. H. Clements, trustees.

As soon as it was possible to procure the facts in the case a representative of the Flume in company with E. N. Marsh and Lieutenant-Governor H. A. W. Tabor visited the property, giving it a thorough and minute examination. The situation is on Buckskin mountain about a mile and a half north-west of the old town of Mosquito, half a mile above timber line, two miles west of Alma and seven from Fairplay, the county seat.

The following claims have been united in the Fannie Barret combination, the Queen Extension the best known lode on which a shaft has been sunk 3½ ft. by 7 ft., to a depth of 41 ft.; mineral was struck at a depth of 6 ft. from the surface and at 35 ft. drifts were run north-east and south-west, 8 ft. each way, showing the same class of mineral throughout. At the foot of the shaft specimens taken indiscriminately assayed from 200 to 230 ozs.; from the Mountain Queen ore has been taken which nets $195, at Golden, after deducting expenses of transportation. The other lodes are the Mountain King, Pride of the Hills, Flat Lode and Silver Seam, on which but little more than assessment work has been done.

Since the discovery and partial development of the property the reports of its value and peculiarity of mineral and formation has attracted large numbers of scientific men and experts, who without exception, unite in the opinion that it is one of the most valuable properties, so far as developed, yet discovered in the State. Prospectors, miners, and capitalists have been equally attracted by the wonderful results shown, and in consequence a large extent of territory has been claimed, and claims have gradually and rapidly appreciated to high figures, and several large investments of property have been made, in purchases from discoverers, backed by ample capital for development. Old claims have been relocated, and owners of long neglected mines have found new inducements for recommencing work.

THE MOUNTAIN KING MINE.—Prof. Charles S. Richardson, one of the most prominent geologists and mining engineers in the country, who has professionally examined not only the property in question, but the whole district says:—

"The ore lies in seams, interstratified with the lime and quartzite. Porphyry beds occur, which increase the value of the mineral deposits in some of the shafts. The ore was first cut at 6 ft. from the surface. The miners have now gone down 41 ft. on this body of ore and there is yet no appearance of coming to the bottom. It consists of gray and yellow copper, the sulphurets and carbonates of lead; manganate and the hydrate of iron, in a gangue composed of calcite and barytes with a little silica. There is not much zinc blende in the ore; some portions, will run 60 per cent. in lead and from 50 to 200 ozs. of silver. The average specific gravity is 285, and it therefore weighs 188 lbs. to the cubic foot. The solid lead will go 375 lbs.; the aggregate quantity of the deposit, must, therefore be enormous if it continues all through the hill, and as it may be seen in the adit levels on the face of the cliff 2000 ft. to the south of the shaft, we have reason to infer its continuity is unbroken. A number of other shafts or prospect pits have been sunk; in all of them the same indications are presented. As the visitor looks on this property to-day, he must come to the conclusion that it is the greatest discovery ever made on this side of the range, and before the year ends will be valued at millions. Below these limetone deposits the Silurian formation stands up in plain definite figures, the rocks are vertical, therefore unconformable with the Devonian above. In it are the true lodes of the country. Through this property several are known to cross, they are copper and gold bearing and are exceedingly rich. Ores of nickel pyrites may be seen at the Alma Museum that assays $2500 per ton, while other rare and valuable minerals are associated with it."

Lieutenant-Governor Tabor, who was a resident of Buckskin Joe some 14 years since, revisited his old place of business yesterday, and gave this property a thorough examination. He is well known as a cautious conversative business man, and while it was evident that he was considerably excited over the prospects, his habitual caution prevented any "gush." He authorises the following:—"That in any case it is a very valuable property, but its real value must be proven by work and development.

Its influence has already been good and has filled the country with prospectors. There is no doubt but there is plenty of mineral, if sought for. The district has never been properly prospected for silver, and the effect of this wonderful find will be to bring out in their true light the mineral resources of Park county."

IS IT RIGHT TO PAY ANY PURCHASE MONEY FOR MINES?

SIR,—In a former communication under the above heading I promised to write a few more letters upon that very important subject, but consequent upon engagements for valuing some extensive continental mines and other pressing matters I have not been able to attend to it. I hope, however, to do so shortly; meanwhile I have to return to you, Mr. Editor, my sincere thanks for the kindness you have exhibited in referring to my work upon the valuation of mines.

I am also under obligation to Mr. Léon and "Looker On" for the part they have taken in supporting what I have already advanced in reference to the valuation of mines. This is the more gratifying, inasmuch as the two gentlemen named are entire strangers to me. The question "Is it Right to Pay any Purchase Money for Mines?" has been considered in the affirmative by the majority of your correspondents, but there is a great deal still to be said upon the subject. It has occurred to me that it is advisable to show as far as it is possible when purchase money should or should not be paid for mines. With this object in view I, therefore, purpose entering into the matter, and I trust to be able to render it clear to your readers.

It is simply a question of what is right or wrong, and I do not think any party spirit should be incorporated in it. If any gentlemen are desirous to discuss it further I am of opinion that the Editor should demond that their names, profession, and place of residence should be published. The reason for this must be evident, especially to those who have read the former correspondence.

With regard to the suggestions of Mr. Léon and "Looker On" that my book should be translated into French I will take it into consideration. H. D. HOSKOLD, C. and M.E., F.G.S., &c.

Madrid, Spain, Sept. 7.

NEWS FROM LAKE SUPERIOR.

SIR,—In my last I alluded to the possibility that the opening up of the western wheat-growing sections of the United States, and the vast territory of the British Provinces, together with a return of Russia to peaceful pursuits having a permanent bearing on the food supply of the world. Cheap bread admits of a scaling down of other prices also, and may we not look for tin and copper to be permanently low. We learn that there is only one copper mine in Cornwall that can at present pay the cost of extracting that metal, and statistics show how lamentable has been the falling off in 20 years. When a tight time comes on mining companies the first operation is to control expenses; often to stop exploring and opening work, and increase the product. Cornwall is evidently past that stage with its copper mines, but some of the more important foreign companies are just there now, desperate efforts to preserve appearances are being made; by-and-bye the weaker of the giants will go to the wall, and then relief to some extent will follow.

On the question of tin Cornwall will evidently have the best of it. Production is increasing, although large numbers of mines have been drawn off from the work, and the rescources of the mines have not yet been taxed very heavily. The result of the last 12 weeks' account at Dolcoath gave quite a handsome profit, at a price for tin far below anything that could be entertained as reasonable two years ago, and evidently the old mine can do something more yet. All those mines working on large lodes can be made to produce tin more cheaply, and nothing will sooner check foreign production than such a course.

There is nothing new among the mines to note here. The Calumet and Hecla Company are just now experimenting with a new stamps, which if successful I will send you a description of. At present they are using the Ball's stamp, and stamping about 135 tons of rock per head per day. With a consumption of one cord of wood they stamp 16 tons of rock, and with 1 ton of coal they stamp 21½ tons of rock. The new machinery is expected to reduce the charge for fuel 50 per cent. A good deal of interest is excited just now concerning this expected improvement, for the fuel bill in stamping is an important consideration.

I notice that the question of steel stamp-heads has been receiving attention in Cornwall of late, and I am of opinion that the experience of the mines here would be valuable to the Cornish mining managers—in other words, I believe Lake Superior can tell Cornwall how to make stamp-heads.

Ball's stamps have a wrought-iron shaft, or lifter; on this a cast-iron shoe is keyed. The heavier heads use a shoe, which when new weighs 625 lbs.; this is worn until it weighs from 180 to 250 lbs., and is then changed. No particular attention was given to stamp shoes until the Calumet conglomerate was opened. The amygdaloid beds and fissure veins produced soft material, much like St. Ives, Lelant, and St. Just tin mines, but it was soon found that the stamp shoe that would run a month on amygdaloid would run only a day or two on conglomerate. A matter of this kind demanded attention, and the company interested arranged with the foundrymen that if a shoe run five days they would pay (say) 5 cents per pound for it, if it would not run so long they would pay nothing, but should it run over that time for each additional day's run they would pay an extra cent per pound. This at once interested the foundrymen; occasionally now a shoe breaks, or does not run five days, but they average higher, and sometimes one runs 10 days. This is probably new to most of your readers, and many of them will be inclined to think that a very poor shoe will run five days, but not so. I can refer to a mill stamping the two kinds of rock. The head that stamps conglomerate requires from five to six new shoes monthly, and the head that is stamping amygdaloid requires only one in a month. Competition has not been confined to local foundries by any means, nor to cast-iron shoes, the best steel shoes sent up into the country has not run on conglomerate 24 hours, and they have been sent from parties who thought they were equal to anything.

Lake Superior shoes for stamp-mills are sent to the Black Hills in large quantities; there they come into competition with makers who have been casting for quartz mills on the Pacific Coast, and so far run half as long again as any that have been brought against them.

This part of my subject may interest some of your readers, and I stand ready to afford any information on the subject they may require.—*Calumet, Mich., Aug.* 18. J. D.

CRANSTON'S ROCK-DRILL.

SIR,—In the observations in last week's Journal on rock-drilling machinery in Yorkshire, there is an error as to the name of the mine where my drills are employed. They are working at the West Pateley Bridge Mines, not at the East Craven Moor Mine, as misstated. Will you kindly rectify the error? ——— J. G. CRANSTON.

ROCK-BORING MACHINERY.

SIR,—We read the remarks of "J. B.," which appeared in last week's Journal, wiih much interest, and regret that it is impossible for us to follow his suggestion to sell our hand-power rock-drill at a reduced price. Did your correspondent know the prime cost of these machines, and the excessive outlay that has been necessary to bring them to their present perfection, he would acknowledge that, as a machine, they are well worth the sum we charge for them. But we maintain that from the purchaser's point of view this is not so much the question. The point really is, what advantages will this outlay of 60*l.* give, or what saving in time or money, or both, will this hand-power drill effect over the ordinary hand labour? Now, we are prepared to show, and willing to guarantee, as stated in our former letter quoted by "J. B.," that the importance of the advantages and effective saving obtained by the use of these simple machines makes their cost, or even a far larger amount, a matter not worth consideration, since the amount can and should be saved by their use in one or two months at most, which fact is evident when we say that headings, for instance, can be driven at double the rate and at half the cost per yard of ordinary hand labour; and, being very anxious that all interested shall know and share our confidence in this machine, which is being practically proved far and wide, we again state that if purchasers are unable to obtain the practical results claimed for this drill we are willing to undertake contracts at the same price per fathom as paid for ordinary hand labour, and failing to obtain rapid advance and to prove the advantages of the machine agree to take it back. We state this not because any difficulty is experienced in its use, as a more simple machine, and one so complete in itself and easily manipulated, we are confident cannot be constructed to drill with such rapidity and certainty in the hardest rocks, but simply to show our confidence, and to court more extended opportunities of quickly proving what will before long be an acknowledged fact; and the reason why we feel so certain as to the future of our machine is because we are daily proving that it effects an enormous saving with a very trifling first cost and maintenance cost, which meets the urgent requirements of the mining interests of the present day.

Kindly give us space for these remarks in answer to your correspondent "J. B.," to whom we shall be happy to give any further evidence he may desire, or to show the various forms of our machine in action in any description of rock.

London, Sept. 11. THOS. B. JORDAN, SON, AND MEIHE.

NEW COAL MINER AND ROCK DRILL

SIR,—Although a large number of coal miners and rock drills are in the market I think it will be admitted that perfection is still far from having been obtained, so that a description of the new invention of Messrs. Harrison and Butler, of Wayne, Michigan, will not be uninteresting to many of your readers. The improved machine is constructed with a drill or pick of peculiar construction, having a concave face or end and thin concave edges. A longitudinal reciprocating motion is imparted to this drill by means of a piston working in a horizontal cylinder and driven by compressed air or steam, which is admitted to the ends of the cylinder alternately by means of either a rotary or reciprocating valve, driven by a double rotary engine consisting of a pair of eccentrics coupled together so as to stop and start at any point, and governed by two slide valves held down by air or steam pressure, as is usual with steam engine valves. The motion of the machine is regulated by a throttle operated by a lever on the end of the valve-chest. A hand wheel is mounted on the shaft of the coupled eccentrics for starting them. In each end of the cylinder is a rubber cushion, that in the forward end through which the piston rod carrying the pick works, being annular, and fitting over a nose projecting inward from the cylinder-head, and screw threaded to secure the rubber cushion, the front face of the piston being recessed to receive said nose.

The form of the piston-rod varies at the different ends. The inner portion may be round, but the outer portion is of square, octagon, or other non-circular shape, and works through a guiding sleeve fitted to rotate on the front cylinder-head, and provided with a pinion to rotate it by means of a cogged segment mounted on a horizontal rod extending back to the rear of the machine, and bent upward to form a hand lever for the purpose of turning the drill or pick, so that its cutting blade may be in either a vertical or horizontal plane as required. The machine is mounted on wheels formed with ratchet teeth and held by pawls, so as to secure the machine against backward movement when working on an inclined surface. It is provided with handles similar to a plough or hand truck by which it may be readily moved from place to place and pushed up to its work. It is made double if preferred—that is, with two cylinders placed side by side and working their drills alternately. COLLIER.

Liverpool, Sept. 8.

COMPRESSED PEAT AS FUEL IN BLAST-FURNACES.

SIR,—The production of pig-iron in the mining districts of the Austrian Alps has increased so much during the last eleven years, particularly in the furnaces of Vordernberg, that great difficulties are experienced in the supply of charcoal, the woods attached to the works not furnishing the requisite supply, and in some cases the charcoal is brought from a great distance by railway. The use of coke, lignite, and peat has been proposed as substitutes for charcoal, either alone or in admixture with it. Coke is unsuitable from the low blowing pressure at most of these works, and also from the deterioration of the metal owing to the presence of sulphur in the coke. Lignite was tried in some furnaces of the Voitschberg district, but the experiment failed, owing to the material decrepitating into small fragments under a high temperature of blast. Peat of a good quality, containing from 1·7 to 4 per cent. of ash in the air-dried state, and practically free from sulphur and phosphorus, may be obtained in large quantities on the Worschach peat moors in the Upper Enns Valley, 70 miles distant. It was determined to erect experimental works for compressing this peat sufficiently close to bear transport. The process selected for compression is that of Hermann Eichphorn, adopted at Failenbach, in Bavaria, which produces what is called ball peat. The raw material is pulped by being passed through a horizontal pug-mill, armed with spiral knives. It is then forced through a circular aperture in a die plate 3·15 in. in diameter, and cut into pieces of the same length by a rotating knife. These pieces are delivered into a nearly horizontal conical drum of wood, 9 ft. in length, which revolves slowly. The cylindrical pieces, by being in contact with one another, are brought to a form nearly spherical. These are discharged from the drum and lifted by an elevator to the top of the drying house, whence they roll down to various shelves, on which they are exposed to the action of the air without more handling. When dried the peat is ready for use, being sufficiently compact to bear transport without loss from breakage.

A small blast-furnace, 30 ft. in height and 560 cubic feet capacity, was chosen for the experiments, as being more likely to show the effect of alterations in the charges sooner than a large furnace, having, besides, the advantages of using a powerful blast-engine and capacious heating stoves. Under ordinary conditions the charges pass through the furnace in 2½ to 3 hours, the production of white pig-iron being 12 to 13 tons per day.

The experiments extended over several months, and were divided into two series.—1st. The charge of pinewood charcoal was constant; peat was added in the proportion of 12, 25, and 50 per cent. by weight.—2nd. The charge of charcoal was decreased as the peat was increased until the maximum of an equal bulk of each was attained corresponding in weight to one-third of charcoal and two-thirds of peat, the density of compressed peat being about twice that of charcoal. Comparing the iron produced with the fuel consumed it was found that by volume 1 cubic metre of charcoal could be substituted by 1·54 cubic metre of peat, or by weight that 100 kilogrammes of the former was equivalent to 305 kilogrammes of the latter. The quality of the iron and the working of the furnace were not altered in any way, but the gases produced when peat was used from their condensation caused a deposit in the gas flues, which necessitated more frequent cleaning than when charcoal alone was used.

After these experiments the method of Barff and Thursfield was tried to some extent, this being a process of carbonising peat by superheated steam; this fuel weighed about double of an equal bulk of soft-wood charcoal. From 50 to 66 per cent. by weight of carbonised peat was added to the charge of charcoal without altering the working of the furnace in any way. As it is less combustible than soft charcoal, resembling in this respect beech and other hard wood charcoals, it is well suited for making grey pig-iron, when a higher temperature is required. The yield of carbonised peat from the raw material is about 45 per cent. by weight, but by analysis it contains only 31 per cent. of carbon, so that a portion of volatile matter is still retained in it. The waste gas in these experiments burnt very hot, the admission passages of the burners in the hot blast stoves and calcining kilns requiring a contraction in area of about one-half.

A comparison of the different fuels used in the experiments show that by weight 100 kilogrammes of soft wood charcoal was equivalent to 280 of air-dried peat, and 109 of peat coal; and that 39 kilogrammes of peat coal was equivalent to 100 of air-dried peat. The cost of transit was thus reduced nearly two-thirds. [Abstract of a paper by A. Enigl.] M. E.

SALE OF TINSTONE FROM CORNISH MINES.

SIR,—In sending you a few remarks on the sales of tinstone in Cornish mines I had no idea of giving offence to "Scrutator" or to anyone else; but it appears as if the arrow shot at a venture has hit the modern Ahab between the points of the harness. I would like to ask "Scrutator" what interest he has in Wheal Prussia that he displays such venom against it. I confess that "Observer" has no interest whatever, and has never been down in the mine, and cannot tell what it is above or below. "Scrutator" displays extraordinary powers in so graphically describing the *modus operandi* of bringing out a mine, and appears to know all about it. I think he does—for, if I am not mistaken, he has spent a lifetime at this sort of work, as a mine promoter or speculator. "Observer" has observed that there are a certain class of men who, when they have failed in every other business, come into Cornwall, and having the "gift of gab," turn mine speculators or promoters of mines. "Scrutator" seems to know all about the Stannaries Court, and thinks Wheal Prussia will drift in that direction. Very likely it would if "Scrutator" had it on hand, for I have reason to believe he has had considerable experience in that Court, as, indeed, in almost every other.

There can be no doubt that "Scrutator" at the present moment is entirely at the mercy of the class of men he speaks so disparagingly of (Cornish merchants), and it is not "Scrutator's" credit that is now keeping the mines he is now interested in out of the Stannaries Court, and that he knows full well. The law has no terror except to evil doers, and the Stannary Court is only a terror to debtors. I am informed that Wheal Prussia will sell 100 tons of tinstone this week; if that is any advantage to "Scrutator" he is quite welcome to it.

Your correspondent suggests that the lords should not allow the sale of tin in the stone. The lords must know that in young mines this can hardly be avoided, unless they wish to postpone the receipt of dues. Take Wheal Agnes for instance—a mine that is now 260 fms. deep, and has been working about 30 years, and never yet paid a shilling to the shareholders; but I presume the lords have had their dues from the sale of tinstone, although there are many thousands of pounds that the unfortunate shareholders are now liable for in the shape of debts for materials supplied to the mine. In fact, the shareholders themselves are hardly aware what they are liable for, as there has been no meeting held for nearly twelve months.

We have lately had some startling revelations as to back debts in Cornish mines, and everyone ought to see that his own house is swept. I fancy there are some dirty corners still left. I by no means wish to speak disparagingly of Wheal Agar; but I merely quote this as an instance that the lords do not always press to have the tinstone stamped and made marketable on the mine, but often consent to the sale of tinstone to the bargain buyers for a long period, as has been and is still being done at Wheal Agar. OBSERVER.

Illogan, Sept. 10.

CORNISH MINING AS A MEANS OF INVESTMENT.

SIR,—The long looked for demand for mining stock has at last set in, and in some cases where shares were unsaleable have risen in value several thousands of pounds, notably South Crofty, reduced by relinquishments to about 700 shares, were obtainable only three weeks since at 2*l.* each, are now in demand at 20*l.* and above. In confirmation of the general revival of mining, it need only be stated that twelve of the leading mines of the county have advanced in market value within the last month something over 120,000*l*; other mines must participate in the improvement which is sure to follow a protracted depression, the late and continuous rise in the value of metals being a strong and sure indication of having passed the turning point, and that there is a bright future for Cornish mining, and those who make a careful selection of stock with a view to invest in its industry. But it cannot be disguised that some mines are destitute of the smallest chance of becoming profitably productive, and should be avoided, while many of real merit have been so neglected as to reduce them to a nominal market value; it is such mines the public should secure for a great and quick rise in value. I well remember the reaction following the panic some 13 years ago, when a rise of 500 per cent. took place in many mines within a month; those mines are now the best investment of the county. Such is the anomaly of the mining market, that there are mines paying current costs with a paid for plant sufficient to carry out extensive works, and possessing all the elements of becoming succesful, quoted at a price less than their materials. *Apropos* to the present opportunity, several years since Tincroft stood at 3*l.* totally neglected, purchased quietly by a Cornishman, and went to 60*l.* each. Dolcoath were sold at 8*l.* per share, and after dividing 200,000*l.* profit sold for 90*l.* each, or 2160*l.* per original 8*l.* share. Tresavean, with 32*l.* 10s. paid up, declined to 5*l.*, wholly ignored by the public, afterwards advanced to 2700*l.* each, and paid in dividends 4500*l.* per (98th) share. South Frances shares were actually relinquised as valueless; at last the turning point came, and they advanced to 800*l.* each, and paid 600*l.* per share in dividend; this mine as depth is attained turns into tin, and has a great future for that mineral. The mines most desirable for investment just now are those well managed concerns selling in the market for less than their plant, and which may shortly rise in public opinion by their own merits, and vie in price with the favourite stock of the market. CHAS. BAWDEN.

St. Day, Scorrier, Cornwall, Sept. 10.

TREATMENT OF TIN ORES.

SIR,—I was pleased to observe Capt. Southey's letter on this important matter in a recent issue of the *Mining Journal*, and I venture to thank him for introducing the subject. At least one-eighth (some competent authorities say one-sixth) of the tin raised in our Cornish mines finds its way into the Red River and other tin streams, and this undeniable fact proves that Captain Southey is working in the right direction when his "object is simply to show a very great saving may be effected in this most vital department of Cornish mining."

Although entirely agreeing with Capt. Southey that our tin dressing, as a whole, is inadequate to the requirements, I cannot endorse his proposed means to remedy matters. His first paragraph, relating to tramming and stone-breakers, may be right in (say) half the mines of the county, but in the other half it is necessary to "trip" the stuff from the pit's mouth into "slides" for "picking." It is advisable—and, indeed, absolutely necessary—in many mines not only to pick out and throw away the "cab," or worse than worthless stuff, but also to select the best work for separate stamping and treatment. Any stuff which does not contain tin will, if introduced into the stamps, carry away a certain amount of tin in slimes. The question of grates has repeatedly been agitated, but now I believe most of our mines, at least in this district, have individually investigated the matter for themselves, and have acted on their own convictions and judgment. Concerning the round buddle in front of the stamps, Capt. Southey says his remarks will, probably, "give rise to a great many differences of opinion." He further states, "the round buddle is one of the worst appliances ever introduced into tin dressing, and the sooner it is numbered with the things of the past the better." I do not hesitate to predict that round buddles will be in universal use when the jigging process (applied to tin ores) has been forgotten.

Permit me to make a few brief remarks on general tin dressing. The stamping process results in dividing the tin into three classes—crop tin, fine tin, and dredge. The dredge tin is that small amount found in the roughs, and is treated by being allowed to run into strips, the heads being re-stamped or pulverised. This is the least important portion of the tin, and can be very easily dealt with. The crop tin, too, offers no difficulty, as owing to its very high specific gravity it is well able to take care of itself. But the fine tin does offer serious difficulties. This it is which goes to enhance the value of the tin streams, being carried away in large quantities in the slimes—hence its name, slime tin. The great question for us to solve in tin dressing is, How can we un-tin the slimes? Now, let us see what Capt. Southey has done with his jigger, and I quote his own words:—"What we want is machinery to economise manual labour, dispatch the work quickly, and save the tin. In order to do this the jigging process should be adopted, and here classification, already alluded to, can be introduced; sending the rough and fine into separate jiggers, which if properly handled will make the mineral pure, or fit for the calciner at the first operation, and without the aid of buddle or dolly-tub. After which you have the slimes, pure and simple, to be dealt with, and I feel certain that no sane man would use the round buddle in preference to frames for this class of stuff. (See Red and other rivers.) Sufficient tables should be erected to deal with the quantity of slime at command, so that when it leaves the last table it should be worthless." From this it will be seen that all Capt. Southey's jigging process does is to separate the crop from the fine tin, after which he "leaves the slimes, pure and simple, to be dealt with" by framing. He has been carrying coals to Newcastle. Every practical tin dresser recognises the fact that no difficulty is experienced in getting out the crop tin. As I said before, the only bother lies in the slimes. Capt. Southey simply brings forward another method of separating crop from slimes, leaving the latter as muddy (literally and figuratively) as ever. Again, as to dealing effectually with slimes by framing, or tables, let Captain Southey recollect that after the slime tin of the Red River passes over a mile and a half (literally thousands) of frames, in running from Tuckingmill to Reskadinnick, yet the seventh company of tin streamers manages to return 12 tons of tin per month; while even at Gwithian, five or six miles down the river, many are able to earn a livelihood by tin streaming. Yet Capt. Southey says, "Sufficient tables should be erected to deal with the quantity of tin at command, so that when it leaves the last table it should be worthless. I hold that the round buddle in front of the stamps, as successfully worked at Carn Brea, Tincroft, and Cook's Kitchen Mines, is by far the best method yet introduced, and I find from repeated experiment that 50 per cent. of the slime tin is saved direct from the stamps without the aid of barrow, shovel, or manual labour of any description.

Captain Southey effects a complete separation in his slime tin and his crop, and I maintain that when this is done a very large proportion of the former unnecessarily runs to waste. The round buddle (in front of the stamps) into which slimes and roughs are received pell-mell, is effectual in making the roughs re-act upon and comparatively un-tin the slimes. In other words, the roughs form a filter through which, assisted by the sweeps, the slime tin is filtered. The light, slimy waste (not half so rich as that from the jigger) is reserved for future treatment, and a large proportion of the fine tin (effectually rescued from the slimes) is saved with the crop.

In conclusion, I would suggest that Captain Southey reads a paper on his jigging process at an early meeting of the Mining Institute of Cornwall. The subject is a most important one, and if brought prominently before our practical men beneficial results must follow.

CHARLES THOMAS.

Cook's Kitchen Mine, Camborne, Cornwall, Sept. 9.

TREATMENT OF TIN ORES.

SIR,—With your permission I beg to offer a few remarks on Capt. Southey's letter. I have carefully looked through it; and, according to his idea of preparing tin for the smelting-house, nothing is required but Blake's stone-breaker and jigging machinery. Well, if he is right most people are wrong, but I must say I am rather surprised that a man of so little experience as Capt. Southey in this department should venture so far as to ignore the process used generally throughout our county. Jigging may be used with advantage in tin dressing no doubt, but if Capt. Southey thinks he can prepare tin for the market with jigging machines alone he will see by the time he has completed his machines, and had a little experience, the folly of a hasty opinion, I might say on other people's suggestions, for, "if I am rightly informed," this jigging is not Capt. Southey's own idea, it having been suggested before Capt. Southey had the management of a tin mine.

I fear Capt. Southey has based his opinions on the success of jigging at West Chiverton. For that mine it is the correct process, where the specific gravity of the minerals differs so much with a very light waste, such as lead, blende, flour-spar, &c.; but tinstuff, as it is sent up from underground, mixed with copper, mundic, woolfram, iron, tin, &c., is a very different thing. What a nice little mess Capt. Southey would have, in the first place, if he was to attempt to save his 50 per cent. by having a stonebreaker at the pit's mouth, and put all his stuff pell-mell, as he calls it, into to the jaws of Leviathan—copper, tin, lead, blende, woolfram, mundic, iron, &c., with a large percentage of waste, such as granite, killas, &c. What is to become of copper and other minerals? It really does not look like business, at all events. What does not produce tin will carry it off. I maintain the cheapest classification is on the spalling-floors.

As a rule, when we have our rich deposits of tin in the county the lode is very soft, and requires but very little breaking, therefore a stonebreaker would be out of the question altogether. For all that the stonebreaker is a very good invention when properly used, but it does not affect the saving that some people are led to believe in our mines. What would apply to a tin mine would not apply to a lead mine, nor would it apply to an iron mine.

Capt. Southey says the round buddle is the worst invention he ever saw—that is his opinion. Now, I beg to differ, it being a very simple process, and up to the present time being a success, as you can take 75 per cent. of the tin from the head of the buddle and carry it direct to the burning-house without any further cost, whilst the tail is comparatively poor. With regard to the tin from the burning-house being finished by jigging, this I think a very absurd idea. In conclusion I would remark that I believe jigging applicable to roughs, as it would greatly reduce the bulk to be dealt with at a stamps or pulveriser.—*Redruth, Sept.* 9. I. C. U.

LITERARY AMENITIES.

SIR,—Your North Wales Correspondent appears to flatter himself that he is entitled to some consideration from having, after exhausting every evasion of which he was capable, tardily acknowledged an error committed by himself, and persisted in for about the space of three months in defiance of my repeated asseverations to the contrary, that I was not the author of a certain letter reflecting on himself which he accused me of writing. The acknowledgment after such a lapse of time and so many evasions is by no means handsomely done, as by the terms employed he appears to consider me indebted to him for having made it, as he immediately adds, just as though the acknowledgment of an error was a grievously meritorious act, entitling one to some distinctive recompense:—"Would he now answer the enquiries in my report from June 14?" The enquiries as here given comprised a question and a request relating to certain passages occurring in a letter of mine on the "Science of Mining," of the previous week (June 7). Question—"What are the fundamental principles of the science of mining in the abstract?" Request: Furnish a few illustrations of the following passage:—"Comprehensivenes of outline should be included in compactness of the plan of workings—that is to say, as many of the objects which indicate fecundity should be aimed at and prosecuted from the most convenient and commanding centre." I am modestly requested to furnish a few illustrations of this. I confess my inability to employ terms more plain, simple, and I may add, axiomatic to express an idea than those used in the above passage, especially if read in connection with the paragraph of which it forms a part. To have recourse to a diagram which would also necessitate an elaborately minute explanatory accompaniment appears to be a task of superorogation, as I have no doubt but that nineteen of every twenty miners who have read the terms fully understood what I intended to convey by them. Practical illustrations of the view I enunciated might be preferable ones—certainly most instructive—and if your correspondent will be disposed to profit by those, and will apply to me I will refer him to one or more which will fully illustrate what I intended should be understood."

The question—"What are the Fundamental Principles of Mining in the Abstract?" may require, for the information of your correspondent, a more extended explanation, as principles are of various kinds, but those I think which relate to practical mining fundamentally are as follows:—First, Knowledge, the principles of which we are told relate to those truths or facts by which other truths or facts become known, and hence principles of knowledge inhere, and proceed in and from knowledge itself, of truths or facts, or both, essential and therefore fundamental in mining, as so much of the unseen has to be inferred from what is seen or known. If induction is attempted on any other than a basis of truth the conclusion must be inevitably erroneous, and the result of its practical application and experimental realisation contrary to what was expected.—Secondly, the principle of action. This principle, whether rightly or wrongly addressed is in itself the same so far as the force exerted and the movement effected is concerned, but the resultant effects will be totally different. Action in respect of practical mining ostensibly takes cognizance of objects, and the mode of its address for the attainment of which is regulated and governed by the principles of knowledge.

As this is known to be not always the case it in no way whatever invalidates my position, as I am treating of the "fundamental principles of mining in the abstract," with no reference whatever to expedients for other than legitimate proceedings. When mining is prosecuted on its merits alone it is highly probable that the essential principles of its most correct curriculum will be adopted and adhered

to with reference to its early or eventual success, as in all such cases the conduct is actuated by estimable motives and a laudable ambition.—Thirdly, there is or should be an express principle of mining which respects propositions for its proper conduct. Achievements and success having its foundation in truth or data occularly demonstrable or logically incontestable.—Fourthly, the operative principle respects the motives which prompt the action influenced by the prospect and desire of success in the acquisition of wealth. That this is a proper, legitimate, and worthily deserved sequel to such an enterprise everyone endowed with proper feelings and judgment will readily admit.

There is another principle indispensable in mining resting on either facts or hypothesis upon which as a datum strain of reasoning proceeds and conclusions are arrived at, true or false, according as the postulate and process proceeded with may be one or the other. This principle is never lost sight of, never in abeyance, the necessity for its use being constant and continuous, as at no period or stage of mining can inferences from facts or hypothesis cease to be drawn. The science of mining is largely developed by the process, and equally dependent for its success on the correctness of both the reasoning, postulates, and premises. The production of the mineral kingdom is governed by laws constant and undeviating, and these laws are expressed and can only be interpreted, so far as the miner is concerned, by a close and intelligent observance of their mode of operation and the effects. Experimental science aids him in the discovery of facts, and these again in reasoning analogically to certain other more or less remote conclusions in respect of more or less remote objects, concerning which he is desirous of obtaining intelligible ideas, by whatever instrumentality, whether from occular evidence or scientific investigation.—*Sept.* 3. ROBERT KNAPP.

LEAD AND LEAD MINING—No. III,

SIR,—It is to be regretted that the history of the past 10 or 15 years should show so many failures and disappointments in lead mining; failures not attributable to mere fluctuations in the price of the metal, but failures to find the mineral in sufficiently paying quantities—in fact, in some instances to find any at all. We have not in this country any means of applying a test to the *bona fides* of any mining scheme; we must rely on the published reports of those who are paid their fees by the parties interested in the success of the scheme; and whilst I do not suggest that all such reports are unreliable, it is quite needless to point out that unfavourable reports are not likely to appear. A single investor cannot afford, or rather would not find it worth while to pay for an independent inspection and report on every mine in which he might feel inclined to invest a few pounds.

Thus we have, added to the uncertainty inseparable from mining, the unreliability of the promises held out. Directors may be men of the highest respectability, but they may be themselves deceived, as there are but very few who have any knowledge of the science of mining. On the other hand, mining must be carried on, it being one of the necessities of human life, and capital must and will be found to carry it on. It might be that lead does not exist in this country in sufficiently rich deposits to enable it to be mined at a profit; but such is not by any means the case. On the contrary, there are lead mines in many parts of the United Kingdom which can compete with any in the world, and we seem to be entering on an epoch when by a rise in the price of lead many mines will be enabled to resume working, and pay a profit. The number of deep lead mines in England are not many, therefore there is no apprehension of our mines being either worked out or too expensive to work. This being so, lead mining is undoubtedly a field of investment well worthy of the attention of the capitalist at a period when so little interest can be obtained for money. Having said a good deal which might be taken as depreciatory of such enterprises let me say a little on the other side.

In the first place, lead mining is not expensive or dangerous; no very large outlays are required, as in a colliery for instance, or ironwork. A capital which would be wholly inadequate in either of the latter would work not one but several lead mines, and there would be quite as great a likelihood of a good return for the money invested. I have started with the determination of not mentioning the name of a single mine, or I would give instances where the capital invested has been returned over and over again.

Another favourable feature in lead mining is that, hitherto at least, it has been free from those unhappy strikes and trade disputes which have done so much to ruin sister industries.

Finally, lead is a metal that cannot, so far as we know, be ever superseded or dispensed with; it enters largely into our domestic and building arrangements, and creates for itself a tolerably steady and usually active demand. No doubt the present depression is in a great measure due to the inclement weather having greatly checked all building enterprise this year. But this state of affairs is merely transitory, and when next spring enables building operations to be renewed there will be probably an unusually brisk demand for lead.

Your correspondent, "Calculator," thinks I have over estimated the deficiency in the stocks of lead; perhaps I have, I merely made a rough guess. The fact, however, is admitted that a serious deficiency does exist, and coupling this with the opinion that an over-average demand is likely to arise, there can be little doubt as to the certainty of a considerable rise in the price of the mineral; though this may be delayed it is, in my opinion, inevitable; and, although I look forward to a return to the highest rates, I may point out that with pig-lead at (say) 18*l.* per ton there would be a very fair margin of profit to really productive mines.

There is another matter which has often struck me in mining accounts, which is that we do not keep a proper capital account There are many underground operations which ought to be charged to capital, and there are others which are really and fairly chargable to the ore sold. I think this ought to be shown, so as to make it apparent whether the mineral is really being obtained at a profit or not. There is, first, the actual cost of stoping out the mineral, and to this must be added the costs of levels which were absolutely necessary for the getting of the ore, and which become dead as soon as the ore is removed. Then there is the drawing to surface, pumping expenses, and, finally, dressing and general expenses. I fancy a fathom (cubic) of lode can hardly go through this process, even under favourable circumstances, much under 5*l.*, therefore it now depends on the produce of that fathom whether there is a profit or not. Thus, suppose it produces 1 ton of clean ore, assaying 75 per cent.; at present prices (say, 15*l.* per ton for pig-lead) it equals 11*l.* 5s. But from this must be deducted the smelter's charges and profit; say, 2*l.* 15s. leaves the price the ore would fetch at 8*l.* 10s. Now, after deducting the 5*l.* as above, and rent, royalty, carriage, and office expenses, there might remain from 30s. to 2*l.* profit, which would not be much to go towards dead work; but if we had a rise of pig-lead all these deductions would remain exactly the same; therefore, for every 1*l.* in price that pig-lead rises 75 per cent. ore would yield an additional profit of 15s. per ton of ore.

I have merely taken a ton to a fathom as an easy instance, but it will be seen that a mine yielding 2 or 3 tons to a fathom would pay a very handsome return. I think every mining man will say I have taken the safe side on my figures. I might explain that I am obliged to use the word cubic fathom, because in many mines the less than a fathom wide, but in others more. An average productive lode ought to produce a ton to a fathom in length, even if not 6 ft. wide; and if over that width ought to produce a ton to every cubic fathom, thus if it were 12 ft. wide; as every lineal fathom of the lode would equal 2 cubic fathoms, it ought to produce 2 tons.

Late years have seen great improvements and changes in the machinery for dressing lead ore, and there is no doubt that we extract on a well regulated dressing-floors nearly all the lead ore but it struck me as a curious fact in looking at the mineral returns that, whilst the produce percentage of the lead ore had increased slightly, that for silver had greatly declined. This is strikingly exemplified in 1874, 1876, and 1878, where the produce of pig-lead is nearly the same—58,000 tons, whilst the produce of silver has fallen from 510,000 ozs. in 1874 to 480,000 ozs. in 1876, to 400,000 ozs. in 1878. Does not this seem to indicate that whilst we are washing out the lead by our elaborate processes we are washing away the silver. There is no doubt that what are called patent jiggers are a great improvement on the old hand jiggers, requiring less labour, and turning out a vastly increased output, besides enabling poorer ores to be treated at a profit. Many of the old halvans left by the hand jiggers are now being re-treated by patent jiggers at a profit. I know one mine instance where such halvans have been taken on a tribute of 5*l.* per ton of clean ore, which, in fact, makes them equal to a lode worth 1 ton to a fathom, as already instanced in a perceding paragraph. In Wales the introduction of the patent jiggers has effected a vast economy, water-power being almost universal, enabling them to be worked almost for nothing.

A comparison (taken from your valuable summary of the Mineral Returns) shows how much the produce of our home lead mines has declined during the last decade. In the years 1864, 1866, and 1868 the gross produce of lead ore was 270,750 tons, with silver to the extent of 2,418,800 ozs.; whilst for the years 1874, 1876, and 1878 the produce of lead was 232,600 tons, the produce of silver having fallen to 1,390,500 ozs., thus showing in round numbers a falling off amounting to 40,000 tons of lead ore, and upwards of 1,000,000 ozs. of silver, amounting to an average yearly loss of 250,000*l.* sterling to the lead mining industries of this country, which has gone into the pockets of foreign producers. This alone shows how large a field for capitalists is presented by our home lead mines, now languishing for want of capital, the investment of which would yield a rich return, and afford employment to many a home now almost on the verge of starvation.

HOPEFUL.

ANCIENT CORNWALL.

SIR,—Pryce, in his treatise "On Minerals, Mines, and Mining," published in the year 1778, says—"Most countries that have been remarkable time out of mind for supplying the world with certain minerals and metals respectively maintain to this day a superiority for their singular products." Among such Cornwall, a portion of the ancient kingdom of Dunmonium, continued to be distinguished as the "Land of Tin."

Tyre and Sidon, situate in Phœnicia, a portion of ancient Palestine, were the the first maratime powers mentioned in history. Tyre, the grand seaport and mart of Phœnicia, was taken and entirely demolished by Nebuchadnezzar, 573 years before the Christian era, so that the latest date of their trading in Cornwall cannot be much less than 2500 years since. They considered this traffic of such importance that they erected forts and castles on the coast for the protection and preservation of their commerce, and a great number of the names of families and places in Cornwall are derived from the Syriac tongue. Tin in those days was found plentifully disseminated on the surface of the valleys and sides of the hills, many ages before deep mining was at all known. Carew and Maynard are of opinion that the working of lodes was unknown to our ancestors for the first ten centuries of the Christian era. Tin in the time of the Phœnicians, some say, was shipped from the Cassiterides, or Scilly Islands, Bolerium, or the Land's End; others say from St. Michael's Mount, and others from Ostium Kenionis Valubia, or Falmouth. Hals, in his "Parochial History," says the harbour of Falmouth was the most commodious for the exportation of tin, and from which harbour by a grand monopoly all the Mediterranean markets were supplied.

Copper mining would seem to have commenced with the last century, the little which had been raised before that period being adventitious, and accidentally met with in the pursuit of tin. From 1726 to 1735 the quantity of copper ores sold from the county was 64,800 tons, at an average price of 7*l.* 15s. per ton. From 1765 to 1775 the ten years yield of copper ore was 264,273 tons, of the value of 1,778,337*l.*, being 26,427 tons, realising 177,833*l.* per annum.

It is a curious fact in connection with Cornish mining that in the year 1742, owing to the low price of tin, a proposal was made by the Mines Royal Company in London to raise a capital of 140,000*l.* to encourage the tin trade by farming that commodity for seven years at a certain price. A committee of Cornish gentlemen was accordingly appointed to consider the proposal, and they reported as follows:—"The quantity of tin raised yearly in Cornwall, at an average for many years last past, hath been about 2100 tons, and it is resolved that 3*l.* 9s. per hundredweight for grain tin and 3*l.* 5s. for common tin are the lowest prices for which such tin be sold to the contractor, exclusive of all coinage duties and fees." TRE, POL, AND PEN.

MINING IN SOUTH DEVON.

SIR,—Mining operations in Combmartin have been principally restricted to one side of the valley only. It is more than probable, however, that the other, and as yet almost untried, part of this once famous silver-lead district will very soon be worked. You have already noticed in your valuable Journal the discovery of the lode running through the property of Mr. John Dovell, which it is said will be worked upon forthwith. Not knowing anything of the gentlemen connected with the undertaking, and who have acquired the lease of the sett, might I suggest to them the necessity of obtaining the lease also of the property immediately adjoining? This could, it is understood, be secured on much more favourable terms now than in a few months time when the lode in Mr. Dovell's property is further developed. The sett will not then be a bit too large; in fact, the property of the above-named gentleman could not successfully be worked by itself, for the lodes all run through the property of Mr. John Boyle, and I heard an authority on mining matters remark that the main shaft ought to be sunk on the land of the latter. I may observe, in conclusion, that there are many persons in this neighbourhood prepared to take shares in this mine as soon as it is brought out in a straightforward and business-like manner, as I do not doubt it will be.—*Barnstaple, September* 4. ROVER.

WHEAL CREBOR.

SIR,—There has been a considerable improvement in this mine, which has given it a prominent position in the market; but, as no independent report has as yet appeared in the Journal, and there are a variety of opinions as to the value of the late discoveries, I herewith send you for publication a report which I received from my inspecting agent, who has visited the mine on four different occasions within the last three months. It is too often the case that a great deal of money is lost in mining by shares being forced up in the market far beyond their value, and it behoves investors to keep in view this fact. Wheal Crebor, at present quotations, is selling at a far greater price than that of our best copper mines, including Devon Great Consols, South Caradon, West Tolgus, and Mellanear—yet all these mines are making large returns, and some paying handsome dividends, whilst Wheal Crebor is making calls, and apparently has reached the extent of one more of the many small bunches of ore for which the mine has for years been remarkable. I may add the report sent you herewith is corroborated by the reports of other agents who have lately inspected the mine. ALFRED THOMAS.

Coleman-street, London, Sept. 11.

WHEAL CREBOR—SPECIAL REPORT.

Sept. 9.—I again send you my report of the above mine. They have not yet communicated the winze sinking in the bottom of the 108 with the 120, but are still driving west in the bottom of the winze on the course of the lode and cross-cutting south at the 120 for that purpose, the lode having been thrown south at the 120, as I have before stated in my former reports, and not yet opened upon as in the winze. I am not prepared to give a valuation, but no doubt when the communication is made with the winze the lode just at that junction will prove about the same value as in the winze—about 35*l.* per fathom—but when driven on in my opinion will decrease in value, as the improvement is only caused by an alteration in the course of the lode. The lode in the bottom of the winze driving towards the 120 is worth about 35*l.* per fathom, and until the communication is made with the 120 I cannot form any other opinion than what I have before stated—that it is only an alteration in the course of the lode, and not a new lode, as reported. The lode in the 108 east is poor, and worth about 6*l.* per fathom. The new south lode at the 108 (as called in Capt. Andrew's report) is only in my opinion the same as I have before stated—a part of the main lode divided by a horse of killas which took place 4 or 5 fms. from where they intersected the present bunch of ore by a cross-cut south, about 9 ft. from the main part of the lode. At the point of intersection the lode is about 8 ft. wide, and worth about 30*l.* per fathom. It is possible that some part of the branch may lead on to the winze sunk in the bottom of the 108, but from the appearance of the lode in the winze and on the new south part of the 108 east, going towards the winze, I am not of opinion that the ground will prove so valuable as it now appears in those two points. In conclusion I would say I think they will be able for some time to pay cost, and may leave a little profit, but not for long, as in my opinion it is only one of Wheal Crebor's bunches of ore. There is nothing new in any other part of the mine. From what I can learn their sampling will only be just as for the last two months.—H. MINERS (Plympton).

CARDIGANSHIRE MINES—SMALL CAPITAL, AND LARGE PROFITS—PREDICTIONS, AND GOOD TIMES.

SIR,—Forty-five years ago, when the Lisburne Mines were purchased, and started to work by the then new company, 2500*l.* only were raised as a working capital, and this has yielded in dividends 239,000*l.*, the mine still continuing rich and profitable. The same company, in the next year, called 500*l.* for capital to work the Old Goginan, and in about eight or nine years they divided between 70,000*l.* and 80,000*l.* in dividends, besides the erection of railways and machinery, which cost nearly 20,000*l.* more. The East Darren was also started at the same time, and with 32*l.* per share called has since divided 235*l.* 10s. per share, and is now as rich as ever. I may mention here that within the last few days a splendid new wheel has been set to work at this mine, which will prove to be a great saving in cost, relieving the steam-engine considerably, and helping other necessary matters, which I have no doubt will lead to increased returns and profits. The wheel, which was christened Miss Pryse, by the daughter of Sir Pryse Pryse, the owner of the soil, went to work admirably, and amidst the greatest enthusiasm of all present, but more especially the working classes, as it was announced that the improvement in the state of trade, and the advance in the price of metals, would allow an improved rate of wages to the miners and workpeople, and which would be carried out at once. This is a beam of sunshine, and from the prospects of other mines in this district I have no doubt this advance will be speedily followed by one and all.

I must now speak a word or two about my Predictions. Since my letter appeared in your valuable Journal the Cambrian Mines have continued to open out splendid courses of copper, the deep level east now yielding 10 tons of rich ore per fathom, whilst the ore is being proved in length, as was prognosticated would be the case. The South Cambrian Mines, where the discovery is altogether a new one, and not found by the "old miners," but by the writer of this, is also opening out, perhaps, the richest mine in Cardiganshire, as from the nature of the ground and the great height obtained by driving the deep adit, coupled with the width and richness of the vein, it will admit of its being worked at a cheaper rate than any other mine I know in the Principality. At present the carriage is heavy, but this will speedily be remedied, as a tramroad will shortly be made from the works to the Forth shipping port and railway station. An outlay of 2000*l.* in working the mine and erection of machinery, which will be completed in less than two months from this date, will place it in a lasting state of prosperity.

My prediction as to Cwm Pryf, now Cwm Pryf United, the ground eastward having been secured and added to it, and from which the Bonsall family derived an enormous amount of wealth, has been fulfilled in every respect. A good course of ore going eastward in the deep adit level was found only about 4 ft. from the side of the workings, and this is proved to be 60 fms. ahead of where we are now opening by the adit level driven in above the deep adit. We have also cleared aud secured into ore ground left for 50 fms. behind our present discovery that will leave one-half of its value in profits on being worked away, or a rich course of silver-lead ore for 110 fms. long by 20 fms. high on an average. To explain the other merits of this mine would occupy more space than you could afford to give in your valuable Journal. I will, therefore, only say that less than 1000*l.* for the erection of crushing power and dressing apparatus is all that is wanted to make this as rich as its northern and southern neighbours ever were—the Goginan standing north, with Cwm Pryf United in the centre, and the Lisburne Mines to the south.

I will now offer a few concluding remarks on the Nant-y-Moch Mine, which is on the East Darren lode, and to the east of it. The mine has only been sunk 30 fms. deep from surface, the lode varying from 40 to 60 ft. wide. In cross-cutting the lode south in the 30 it seems like an entire mass of fine or slime ore. This mine is now being registered, with a capital of 10,000*l.*, and it is the opinion of all parties who have reported on it that 2000*l.* is sufficient to prove it to be the greatest prize in this country.

In a few days I hope to have the pleasure of announcing in the Journal that the machinery has been started, and with the same favourable announcement to the miners as mentioned in this was made at the starting of the "Miss Pryse" at East Darren, "that the improved prospects in mining and metals will allow an improved price in their rate of wages," and that the Nant-y-Moch lode may continue worked for as many years, and to give as much profit eastward as it gave to Sir Hugh Middleton and the present company westward. The shares being 1*l.* each offer a grand chance to all who may choose to invest in it, as high or low may, if they choose, have a finger in this pie.—*Goginan, Sept.* 11. ABSALOM FRANCIS.

[For remainder of Original Correspondence, see this day's Journal]

PRUSSIAN BLUE FROM RED OXIDE OF IRON.—It is well known that Prussian blue is ordinarily manufactured from the protosulphate of iron and ferrocyanide of potassium, by which process a pale blue precipitate is at first obtained, which acquires the characteristic dark blue tint by exposure to the air, whereas the persalts of iron when treated with the ferrocyanide of pottassium at once assume the desired dark-blue colour directly the respective salts come in contact with each other, and Mr. ALEX. WATT, of Battersea has taken advantage of this well known chemical fact in working out his improvements, the object of which is the treatment of native red oxide of iron by chemical and mechanical means, whereby is obtained economically certain products which are useful in the arts—Prussian blue, jewellers' rouge, and a red pigment suitable (when mixed with oils and such usual ingredients) for coating iron and other surfaces. For the purpose of his invention he treats red iron ore (peroxide or sesquioxide of iron) with strong hydrochloric acid, and with the assistance of moderate heat, whereby he obtains a very rich solution of perchloride of iron at a very moderate cost. The solution thus obtained is afterwards diluted with water, and the Prussian blue precipitated in the ordinary way by ferrocyanide of pottassium. The blue pigment is then washed and treated as usual.

HUMID REDUCTION OF METALS.—An improved mode of operating in the separation of lead, zinc, silver, or copper in mixed ores or metallic mixtures has been patented by Mr. F. MAXWELL LYTE, of the Scientific Club, Savile-row. The invention relates to the application of a methodical, alternate, and continuous system of treatment of ores or metallic compounds by means of acid, wherein by a convenient disposition of the vessels and a special order of decantations the same acid is caused to pass successively over a series of two or more batches of ore, thus becoming completely saturated with the zinc and copper the said ore may contain, and becoming consequently as neutral as possible. Thus while the utmost possible economy of acid is obtained the least possible quantities of lead or iron are carried over in solution with the zinc or copper (the said lead and silver and most of the iron remaining behind with the gangue), so that the lead and silver which have become converted into chlorides can be readily taken up with boiling brine and precipitated together as usual with metallic zinc. He so arranges the attacking vats in which the ore is treated with the acid as to be able to decant the liquids from one of these to any other, and he so ordains the order of the decantations, the withdrawal of the saturated liquors, and the additions of fresh acid, that each time a batch of saturated zinc or zinc and copper chlorides are withdrawn from one end of the series a fresh batch of the acid can be added at the other end.

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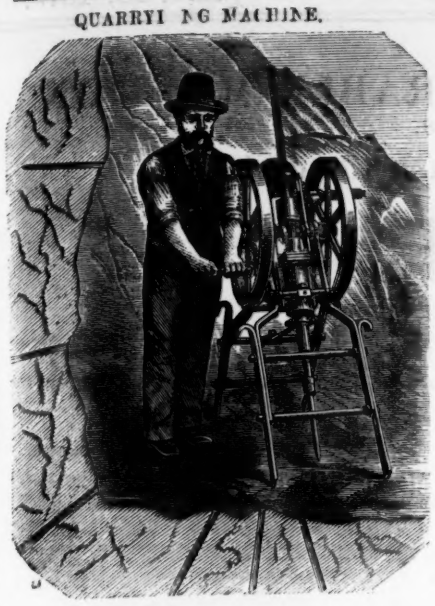

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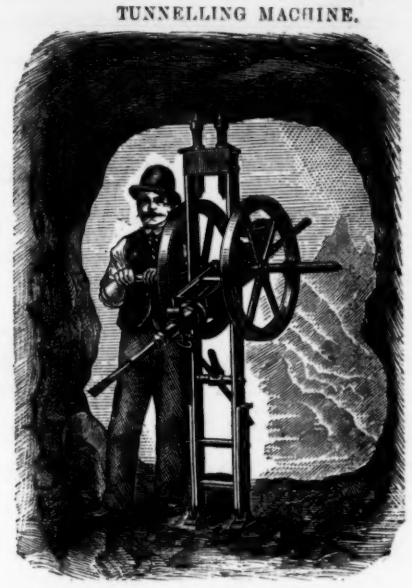

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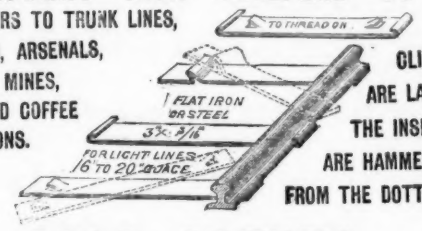

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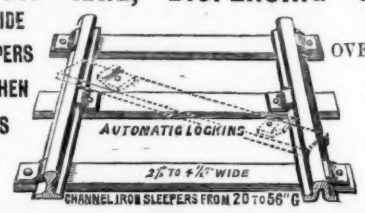

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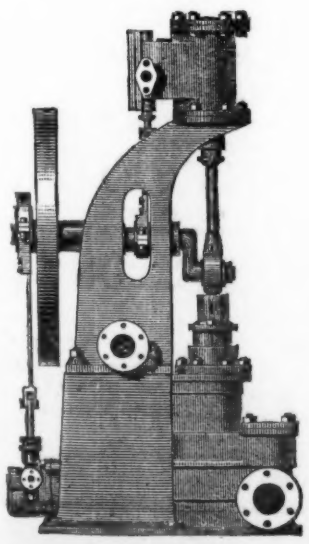

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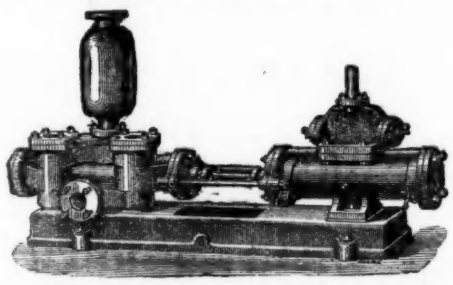

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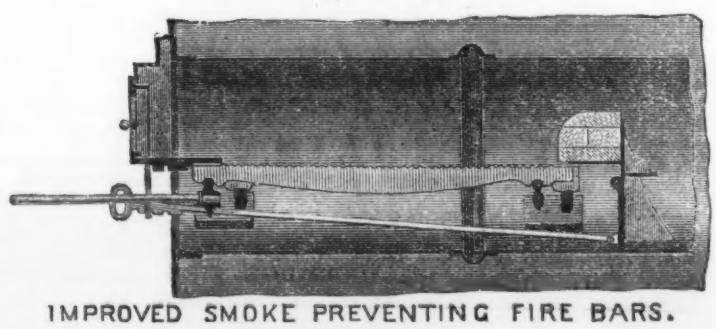

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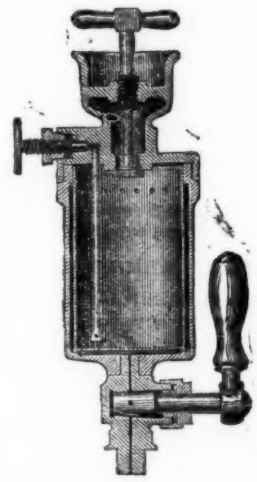
PRICES ON APPLICATION.

TORKINGTON AND HEY'S PATENT.



PRICES OF LUBRICATORS.

No.	Horse-power.	Price.
1	Agricultural Engines...	7s. 6d.
2		10 0
3	5 to 7	20 0
4	7 10	25 0
5	10 20	30 0
6	20 30	37 6
7	30 50	47 6
8	50 70	60 0
9	70 100	85 0
10	100 200	110 0

At the **PARIS EXHIBITION** the Jurors have Awarded

THE GOLD MEDAL, THE SILVER MEDAL, AND HONOURABLE MENTION

FOR MY LATEST PATENTED STONE BREAKERS AND ORE CRUSHERS.

Stones broken equal, and Ores better, than by hand, at one-tenth the cost.

H. R. MARSDEN,

ORIGINAL PATENTEE AND SOLE MAKER OF **BLAKE'S**

Improved Patent Stone Breakers & Ore Crushers.

New Patent Reversible Jaws, in Sections, with Patent Faced Backs.

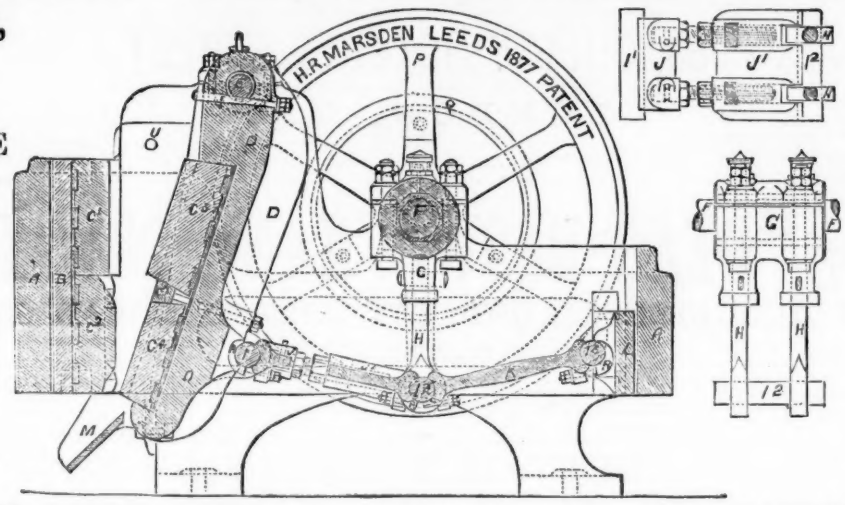
NEW PATENT ADJUSTABLE TOGGLES.

OVER **2500** IN USE.

New Patent Draw-back Motion.

NEW PATENT STEEL TOGGLE BEARINGS.

70 PRIZE MEDALS.



READ THIS—

Wharthole Lime Works, Maryport, Whitehaven, November 7, 1873.

H. E. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.

DEAR SIR,—The machine I have in use is one of the large size, 24 in. by 12 in. The quantity we are breaking daily with this one machine is 250 tons, the jaw being set to break to a size of 2¼ in. We have, however, frequently broken over 300 tons per day of ten hours, and on several occasions over 360 tons during the same period. The stone we break is the blue mountain limestone, and is used as a flux in the various ironworks in this district. We have now had this machine in daily use for over two years without repairs of any kind, and have never had occasion to complain of any inconvenience in using the machine. I hope the one you are now making for me may do its work equally well. The cost—INCLUDING ENGINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES OF EVERY KIND—is just 3d. per ton. Should any of your friends feel desirous of seeing one of your machines at work, I shall have much pleasure in showing the one alluded to.

I am, dear Sir, yours very truly,
WILLIAM MILLER.

AND THIS—

Wharthole Lime Works, Aspatria, Cumberland, July 11th, 1878.

H. R. MARSDEN, Esq., Soho Foundry, Leeds.

DEAR SIR,—We are in receipt of your letter of 4th inst. I may just state that the stone breaker above named has been under my personal superintendence since its erection, and I have no hesitation in saying that it is as good now as it was five years ago.

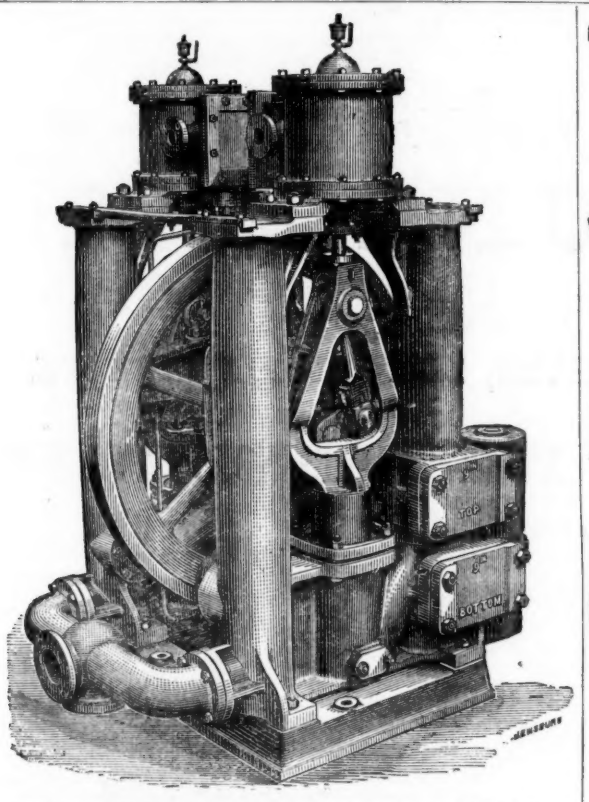
I am, dear Sir, yours faithfully,
FRANCIS GOULD.

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

CATALOGUES, TESTIMONIALS, &c.

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.



STEAM PUMPS for COLLIERY PURPOSES, specially adapted for Forcing Water any height; also for Sinking; and for Feeding Boilers.

JOHN CAMERON has made over SIX THOUSAND.

WORKS: OLDFIELD ROAD, SALFORD, MANCHESTER.

ASBESTOS.

ASBESTOS ENGINE PACKING,
ASBESTOS MILLBOARD JOINTING,
ASBESTOS BOILER COVERING,
ASBESTOS CEMENT,
ARE UNRIVALLED.

Sole Patentees and Manufacturers:
THE PATENT ASBESTOS MANUFACTURE CO. (LIMITED),
31, ST. VINCENT PLACE, GLASGOW,
AND 10, MARSDEN STREET, MANCHESTER.
From whom Price Lists and all information can be had.

THE GREAT ADVERTISING MEDIUM FOR WALES.

THE SOUTH WALES EVENING TELEGRAM
(DAILY), and
SOUTH WALES GAZETTE
(WEEKLY), established 1857,
The largest and most widely circulated papers in Monmouthshire and South Wales
CHIEF OFFICES—NEWPORT, MON.; and at CARDIFF.

The "Evening Telegram" is published daily, the first edition at Three P.M., the second edition at Five P.M. On Friday, the "Telegram" is combined with the South Wales Weekly Gazette," and advertisements ordered for not less than six consecutive insertions will be inserted at an uniform charge in both papers.
P. O. O. and cheques payable to Henry Russell Evans, 14, Commercial-street Newport, Monmouthshire.

THE NEWCASTLE DAILY CHRONICLE
(ESTABLISHED 1764.)
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Offices, Westgate-road, Newcastle-upon-Tyne; 50, Howard street North Shields: 195 High street, Sunderland.

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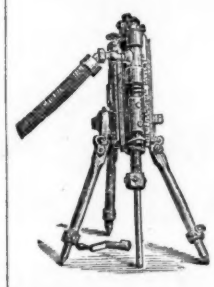
MINE AND QUARRY STANDS, STEEL DRILLS, SPECIALLY PREPARED INDIARUBBER HOSE, TESTED IRON PIPES, &c.



Air-Compressing Machinery,

Simple, strong, and giving most excellent results, and
ELECTRIC BLASTING APPARATUS.

Full particulars of rapid and economical work effected by this machinery, on application.

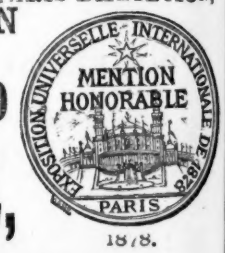
R. H. HARRIS, late
ULLATHORNE AND CO., Mechanical and Consulting Engineers,
63, QUEEN VICTORIA STREET, LONDON, E.C.

PARIS EXHIBITION,

1878.

HONOURABLE MENTION
Awarded to
SALMON, BARNES, & CO
FOR THE PATENT
ROANHEAD ROCK DRILL,
AND THE HIGHEST AWARD FOR
IRON AND WOOD REVOLVING SHUTTERS,
Worked by their PATENT BALANCE-WEIGHT MOTION.
Canal Head Foundry and Engineering Works, Ulverston,
LANCASHIRE.

PARIS EXHIBITION,



1878.

GOLD MEDAL AWARDED, PARIS EXHIBITION, 1878.

THOMAS TURTON AND SONS,

MANUFACTURERS OF
MINING STEEL of every description.
CAST STEEL FOR TOOLS. CHISEL, SHEAR, BLISTER, & SPRING STEEL
MINING TOOLS & FILES of superior quality.
EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS.
LOCOMOTIVE ENGINE, RAILWAY CARRIAGE and WAGON SPRINGS and BUFFERS.
SHEAF WORKS AND SPRING WORKS, SHEFFIELD.
LONDON OFFICES.—90 CANNON STREET, E.C. PARIS DEPOT—12, RUE DES ARCHIVES.

J. WOOD ASTON AND CO., STOURBRIDGE

(WORKS AND OFFICES ADJOINING CRADLEY STATION),
Manufacturers of
CRANE, INCLINE, AND PIT CHAINS,
Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS, RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.
Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions.
STOURBRIDGE FIRE BRICKS AND CLAY.

Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors) at their offices, 26, FLEET STREET, where all communications are requested to be addressed.—*September 13, 1879.*